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Iraq: Environmental Impact of Baghdad's Marsh Drying Scheme [redacted]

Overview

Since early 1992, Baghdad has constructed a series of causeways, dams, and canals that have dried up substantial portions of the Hawr al Hammar and Al Amarah marshes in southeastern Iraq. These actions--part of Saddam's attempts to quell the insurrection in the south--have disrupted an ancient wetland ecology:

- The loss of surface water has damaged or destroyed the habitat of numerous indigenous wetland animal and plant species.

- **Some surface salts may have been deposited in the marshes, increasing the salinity of local soils.** [redacted]

Over the long term, other ecological problems probably will occur:

- **Drought-resistant scrub bushes and other plants will most likely begin replacing native species.**

- **Flooding may increase because of the loss of the marshes' absorption capacity.**

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- The marshes also served to filter silt and pollutants; **their destruction will probably increase chemical runoff into the northern Persian Gulf and increase sedimentation in the diversion canals, the Shatt al Arab waterway, and Shatt al Basrah canal.** [redacted]

Baghdad claims it has plans for agricultural development in the former marshes, [redacted]

- The regime has mismanaged irrigation schemes in recent years south and west of Baghdad; **if it were to cultivate the marshes, similar mismanagement there would likely create even more serious soil salinization problems than currently exist.** [redacted]

Background

Since early 1992, Baghdad has undertaken a number of projects designed to dry the Hawr al Hammar and Al Amarah marshes in southeastern Iraq and thus deprive Shia insurgents of a base of operations. The regime diverted the Euphrates River, which partly supplied the two marshes as it flowed between them, via two canals to the Shatt al Basrah. [redacted] Baghdad also diverted water from the west bank distributaries of the Tigris River, the primary source of the Al Amarah's waters, via a series of causeways and canals known collectively as the Glory River; other Tigris water was shunted via another canal, the Crown of Battles River, that flows into the Hawr al Hawizah marsh on the Iran-Iraq border. Excess water from this marsh is drained into the Shatt al Arab waterway. These activities have desiccated the wetland habitat on which the rebels and the area's indigenous residents subsisted and caused possibly irreparable ecological damage. [redacted]

No Surface Water

As a result of the Iraqi marsh-drying scheme, surface water has largely evaporated from the 2,600-square-kilometer Hawr al Hammar and 1,700-square-kilometer Al Amarah marshes--which together comprise an area roughly one-fourth the size of New Jersey. [redacted] Only some small pools in the onetime streambeds that fed or drained the marshes occasionally remain. Over the remainder of the surface, only clumps of mostly dead vegetation now remain; vegetation that subsisted on the water surface--including water ferns and grasses--have also died off. [redacted]

Immediate Ecological Effects

The most dramatic impact from the loss of surface water has been the widespread destruction of indigenous vegetation that needs year-round water for subsistence. This includes the algae and bacteria that lived in the root system of the marsh vegetation; these formed the first stage of the food chain and most likely will take years to become reestablished even if water were reintroduced. Other plants affected include mint, thistle, and the marsh reeds, or qasab, which were prolific throughout the Al Amarah. [redacted]

Some plants native to the marshes may remain, however, subsisting on the meager rainfall that occurs during the wet season or in a dormant state.[2] These species grow quickly during the wet season and revert to a seed or bulb state when dry, according to an authoritative academic source. They may also subsist where ground water is close to the surface. [redacted]

As a result of the loss of their habitat, an assortment of wetland wildlife species have likely fled or died. Water buffalo, wild boars, and otters are among the larger animals affected--primarily in the Al Amarah--according to an academic source. The marshes are also the sole habitat for one possibly unique animal--the red pest rat-[redacted] if proven a separate species--rather than a variety of the ordinary pest rat--it could be considered an endangered species. Various fish populations have also disappeared, including barbel and carp, on which the local marsh inhabitants depended for protein. [redacted] Most frogs and snakes are probably dead as well. Numerous species of migratory and local birds also inhabited the marshes, including ducks, eagles, falcons, herons, and pelicans. Most birds have probably relocated to nearby areas, like the Hawr al Hawizah, although these new populations will likely stress the carrying capacity of these areas. [redacted]

In addition to affecting the flora and fauna, the drying of the marshes has most likely made the ground surface in parts of the former marshes, particularly the Hawr al Hammar, more saline. Although further detrimental salinization of soils typically requires an extended period of wetting and drying, some salt accumulation or crust may have formed on the bed of the former marsh as surface water evaporated. [redacted] The exposed lake bottom of the former Hawr al Hammar may be more saline than the Al Amarah because it was fed by the more saline Euphrates River. In the Al Amarah, depositions would probably be the thickest in the southernmost portions because fresh water from the Tigris entered the marsh in the north. [redacted]

Longer Term Ecological Effects

The former marshes' ability to recover will decrease over time. The flooding regime of a marsh determines its ecological character, and slight variations result in drastic changes in vegetation patterns, according to an academic source. The longer that surface water is absent, the less likely various wetland plant species will survive--even in a dormant state. Drought-resistant species will most likely begin to encroach from the edges of the former marshes. These include low shrubby perennials that are seemingly lifeless during the summer but grow actively after winter rains, according

[redacted]

to an authoritative source. At the same time, some species that move in--like the deep-rooted tamarisk shrub--may be able to tap into ground water resources, according to an authoritative source. If the former marshes were reflooded after a long period, it would take years for them to reestablish the abundance and diversity of plant and animal life as they once had; shallow lakes, generally devoid of vegetation, would most likely form first, according to an academic source. Plant life would begin at the lake's edges and slowly establish itself in the lake over time.

The loss of the marshes may also create new flooding problems in southeastern Iraq. Water spreads out over a relatively greater area when it enters a marsh, thus dissipating its force and acting like a sponge to absorb excess high water, according to an academic source. Channeling it between causeways or in canals as the Iraqis have done may result in flooding problems during times of high water--April to June--after the spring runoff from the higher elevations upstream has entered the Tigris and Euphrates.[5]

the fact that the Iraqis have had to build causeways around streams shows the measures they have had to take to contain the new volume of water that resulted from the loss of the marshes' absorption capacity.

The drying of the marshes may have a deleterious effect on the water quality in the northern Persian Gulf. As river water entered the marshes, its velocity slowed, causing sediments and chemicals from agricultural runoff upstream to drop out of the water column, according to an academic source. A variety of natural processes then removed certain chemicals from the water; others simply settled into the marsh sediments. Without the Al Amarah and Hawr al Hammar marshes, these chemicals most likely will enter the northern Gulf and could negatively affect marine life.

The absence of this filtering role will also increase sedimentation in the Iraqi diversion canals and further downstream in the Shatt al Arab. Eventually, the Iraqis will most likely need to dredge the canals

Increased sedimentation will make attempts to reopen the Shatt al Arab more difficult.

[5]Similar problems have occurred in the lower Mississippi River. Formerly, bottomland hardwood forests along the river stored floodwater equivalent to about 60 days' river discharge; capacity has been reduced to about 12 days because of the leveeing of the river and draining of the floodplain, according to an academic source. Because the river has been confined to a narrower channel and has lost a natural storage capacity, periodic flooding has increased.

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Effects of Potential Agricultural Development

Despite the fact that soils in some areas of the marshes already had high concentrations of salts and gypsum and that the drying process has probably left portions of the surface even more saline, Baghdad may eventually follow through on its claims that it wants to expand irrigation agriculture into the former marshes. During the next few years, Iraqi farmers could introduce crops such as rice, alfalfa, barley, and salt-tolerant tomatoes; the Iraqis may also plant date palms along waterways to make up for extensive losses suffered during the Iran-Iraq war. [redacted] irrigation may be more easily accomplished in the former marshes than in other cultivated areas because water can be diverted into the network of waterways that formerly crisscrossed the marshes. Nevertheless, extensive clearing and other preparations would be needed to build an efficient system of irrigated cultivation. [redacted]

If the Iraqis use the same agricultural practices they have used elsewhere to cultivate similar marsh areas, the Hawr al Hammar's and Al Amarah's already saline soils could experience even more severe salinity problems. Iraqi farmers typically use flood-and-furrow irrigation to water field crops; this leaves salts behind on the surface when the water evaporates, unless the soils are leached and properly drained. Although Iraqi farmers are capable of properly managing the soils, they often take short cuts for short-term boosts in crop productivity. [redacted] If extensive salinization occurs in the marshes, it would not only reduce agricultural potential but also hamper the ability of the marshes to return to their former state. [redacted]